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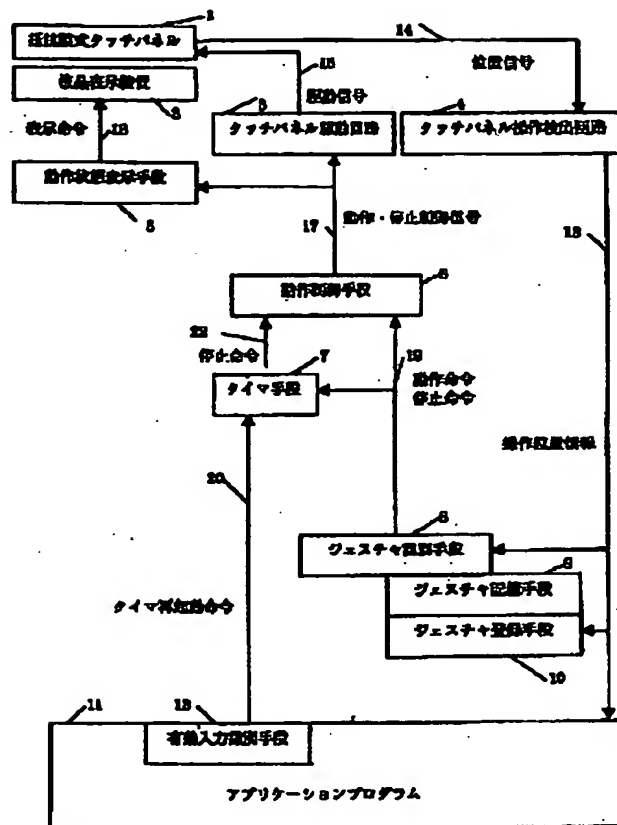
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TITLE : PORTABLE TERMINAL HAVING
TOUCH PANEL



ABSTRACT : PROBLEM TO BE SOLVED: To provide a portable terminal which can surely and pleasantly apply an input operation of a touch panel.

SOLUTION: A touch panel control part of a portable terminal includes a gesture register means 10 which registers a simple operation as a gesture to a specific area of a touch panel 1, a gesture identification means 8, a valid input identification means 13, a timer means 7, a touch panel action control means 6 and an operating state display means 5 which displays an input received from the panel 1. Then a gesture that validates an input operation is identified, and the input operation of the panel 1 is validated, while a gesture that invalidates an input operation is identified and the input operation is invalidated. When the means 7 detects that no valid input operation is given from the panel 1 for a fixed time, input operation is invalidated until a gesture to validate an input operation is detected. Thus, the valid/invalid control of the panel 1 is attained by an instruction given in a simple gesture.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the personal digital assistant equipment which changes effective/invalid of actuation of a touch panel by gesture especially about the personal digital assistant equipment which has a touch panel.

[0002]

[Description of the Prior Art] While displaying various kinds of information, a screen is touched with a touch pen, a finger, etc., personal digital assistant equipment is operated or there are some which carried the touch panel for performing a data input etc. in personal digital assistant equipment. The configuration of the touch panel of conventional personal digital assistant equipment is shown in drawing 3. In drawing 3, the resistance film type touch panel 1 is equipment which detects the location which touched the screen with the finger, the pen, etc. A liquid crystal display 2 is equipment which displays an alphabetic character and an image. The touch panel drive circuit 3 is a circuit which generates the driving signal 15 which scans the resistance film type touch panel 1. The touch panel actuation detector 4 is a circuit which detects the position signal 14 from the resistance film type touch panel 1, and changes into the actuation positional information 18 whether it is under positional information and actuation (** NDAUN condition) and in the condition (pen rise condition) which is not operated.

[0003] Actuation of the conventional personal digital assistant equipment shown in drawing 3 is explained. Drive control is carried out by the touch panel drive circuit 3, and the resistance film type touch panel 1 tells a user's touch panel actuated valve position to the touch panel actuation detector 4 as a position signal 14. The touch panel actuation detector 4 changes into the actuation positional information 18 whether it is under positional information and actuation (** NDAUN condition) and in the condition (pen rise condition) which is not operated about a position signal 14. A liquid crystal display 2 displays the locus, the alphabetic character by the application program 11, and drawing of touch panel actuation with an application program 11. If personal digital assistant equipment is working, alter operation is always possible for the touch panel of such conventional personal digital assistant equipment.

[0004] Moreover, about actuation of a touch panel, the switch changed to an invalid is equipped apart from a touch panel, carelessly, data are inputted from a touch panel and there is also effective or a thing which can be prevented from malfunctioning.

[0005]

[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional personal digital assistant equipment, when personal digital assistant equipment was working, and the user was fully careful and did not operate it, there were an incorrect input by the hand of holding personal digital assistant equipment, and an incorrect input by touching other objects, and operability was bad. Moreover, even if it was personal digital assistant equipment equipped with the switch which can confirm actuation of a touch panel or can make it an invalid, there was inconvenience of actuation of a switch being troublesome or forgetting the switch actuation which makes actuation of a touch panel an invalid.

[0006] This invention solves the above-mentioned conventional trouble, and aims at

offering the outstanding personal digital assistant equipment which makes alter operation by the touch panel simply and reliable, and can use it comfortably. [0007]

[Means for Solving the Problem] A gesture registration means to register into the touch panel control section of personal digital assistant equipment as gesture the simple actuation to the specific field of the touch panel set as arbitration in this invention in order to solve the above-mentioned problem, The alter operation from a touch panel Effective or a gesture discernment means to identify the gesture made into an invalid, A terminal actuation scene selection means to identify the scene of personal digital assistant equipment of operation, and the effective alter operation from a touch panel fixed time amount A timer means to detect that there is nothing, It considered as the configuration possessing the control means of operation which makes alter operation from a touch panel an invalid until it confirms touch panel actuation or the gesture to confirm is newly detected, and an operating state display means to indicate whether it is impossible whether it can input from a touch panel.

[0008] Thus, by having constituted, control of the effective invalid of the touch panel according to the operating condition of personal digital assistant equipment can be realized, and the outstanding personal digital assistant equipment which a user can operate certainly and comfortably can be offered.

[0009]

[Embodiment of the Invention] In the personal digital assistant equipment with which invention of this invention according to claim 1 carried the touch panel A gesture registration means to register as gesture the simple actuation to the specific field of said touch panel set as arbitration, The alter operation from said touch panel Effective or a gesture discernment means to identify the gesture made into an invalid, According to the result of having identified gesture, they are effective or personal digital assistant equipment with a touch panel which established the means made into an invalid about the alter operation from said touch panel. It has an operation of controlling the effective invalid of touch panel actuation, by registering the gesture for controlling the effective invalid of touch panel actuation by liking of a user, and operating the registered gesture.

[0010] Invention of this invention according to claim 2 is set to personal digital assistant equipment with a touch panel according to claim 1. A means to register into said gesture registration means the gesture which confirms alter operation from said touch panel according to the scene of personal digital assistant equipment of operation is established. A means to identify the gesture which confirms alter operation from a touch panel for said gesture discernment means according to the scene of personal digital assistant equipment of operation is established, and it has an operation of controlling the effective invalid of actuation by the gesture according to a scene of operation.

[0011] In claim 1 and the personal digital assistant equipment with a touch panel of two publications, invention of this invention according to claim 3 has an operation of making actuation of a touch panel into an invalid automatically, when a means to detect that there is no effective alter operation from said touch panel fixed time amount is established and there is no effective alter operation fixed time amount.

[0012] Invention of this invention according to claim 4 is set to claim 1 and the personal digital assistant equipment with a touch panel of two publications. The effective alter operation from said touch panel fixed time amount A means to detect that there is nothing according to the condition of a personal digital assistant machine, The means which

makes an invalid alter operation from said touch panel is established until the gesture which confirms alter operation from said touch panel is newly detected, and it has an operation of making touch panel actuation into an invalid according to a scene of operation.

[0013] In personal digital assistant equipment with a touch panel according to claim 1 to 4, invention of this invention according to claim 5 establishes a means to indicate whether the alter operation from said touch panel is unable to be possible, and has an operation that the effective invalid of actuation of a current touch panel is shown to a user.

[0014] Invention of this invention according to claim 6 the simple actuation to the specific field of the touch panel set as arbitration The alter operation from said touch panel is registered according to the scene of personal digital assistant equipment of operation as effective or gesture made into an invalid. Effective or the gesture made into an invalid is identified for the alter operation from said touch panel according to the scene of personal digital assistant equipment of operation. According to the result of having identified gesture, it has effective or an operation of being the control approach of the personal digital assistant equipment with a touch panel made into an invalid, and controlling the effective invalid of actuation by the gesture according to a scene of operation for the alter operation from said touch panel.

[0015] Invention of this invention according to claim 7 is set to the control approach of personal digital assistant equipment with a touch panel according to claim 6. It detects that there is no effective alter operation from said touch panel fixed time amount. When alter operation from said touch panel is made into an invalid and there is no effective alter operation fixed time amount until the gesture which confirms alter operation from said touch panel is newly detected, it has an operation of making actuation of a touch panel into an invalid automatically.

[0016] Hereafter, the gestalt of operation of this invention is explained to a detail with reference to drawing 1 and drawing 2.

[0017] (Gestalt 1 of operation) The gestalt of operation of the 1st of this invention is personal digital assistant equipment with a touch panel which formed a gesture registration means, the gesture discernment means, the timer means, the control means of operation, and the operating state display means in the touch panel control section.

[0018] Drawing 1 is the block diagram showing the configuration of the 1st of the personal digital assistant equipment of the gestalt of operation of this invention. In drawing 1, the resistance film type touch panel 1 is equipment which detects the location which touched the screen with the finger, the pen, etc. A liquid crystal display 2 is equipment which displays an alphabetic character and an image. The touch panel drive circuit 3 is a circuit which generates the driving signal 15 which scans the resistance film type touch panel 1. The touch panel actuation detector 4 is a circuit which detects the position signal 14 from the resistance film type touch panel 1, and changes into the actuation positional information 18 whether it is under positional information and actuation (** NDAUN condition) and in the condition (pen rise condition) which is not operated. It is a means to display on a position whether the operating state display means 5 can give a display instruction 16 to a liquid crystal display 2, and can input it into it from the resistance film type touch panel 1. The control means 6 of operation is a means to output actuation / halt control signal 17 to the touch panel drive circuit 3 and the

operating state display means 5.

[0019] The timer means 7 is a means to output stop instruction 22 to the control means 6 of operation, when the deadline of assignment time amount is clocked and passed. The gesture discernment means 8 is a means to detect the predetermined actuation to the resistance film type touch panel 1 based on the actuation positional information 18. The gesture storage means 9 is memory which memorizes the predetermined actuation to the resistance film type touch panel 1. The gesture registration means 10 is a means to store the predetermined actuation to the resistance film type touch panel 1 in the gesture storage means 9. An application program 11 is a program for realizing the various functions of personal digital assistant equipment. The effective input discernment means 13 is a means to output the timer reboot instruction 20 to the timer means 7, when there is an effective input to the resistance film type touch panel 1.

[0020] Actuation of the personal digital assistant equipment of the gestalt of operation of the 1st of this invention constituted as mentioned above is explained with reference to drawing 1. First, fundamental actuation is explained. Drive control is carried out by the touch panel drive circuit 3, and the resistance film type touch panel 1 tells a user's touch panel actuated valve position to the touch panel actuation detector 4 as a position signal 14. The touch panel actuation detector 4 changes into the actuation positional information 18 whether it is under positional information and actuation (** NDAUN condition) and in the condition (pen rise condition) which is not operated about a position signal 14. A liquid crystal display 2 displays the locus, the alphabetic character by the application program 11, and drawing of touch panel actuation with an application program 11.

[0021] Next, the actuation which registers gesture is explained. A user decides the field of the arbitration of the resistance film type touch panel 1 to be a gesture input area, and decides the simple actuation (for example, actuation which carries out a double-tap) to the field to be gesture. At this time, the gesture which confirms alter operation from the resistance film type touch panel 1 is decided. If personal digital assistant equipment is set as gesture register mode, since "Input gesture" will be displayed on a liquid crystal display 2, gesture actuation is performed to a gesture input area. The gesture registration means 10 stores the actuation positional information 18 (positional information and time series information on an actuation condition) of the gesture in the gesture storage means 9 as a gesture pattern. After registration of gesture finishes, a user cancels the gesture register mode of personal digital assistant equipment. Now, gesture registration is ended.

[0022] Next, the actuation which identifies gesture and suspends alter operation is explained. In the normal operating state of personal digital assistant equipment, the gesture discernment means 8 supervises the actuation positional information 18, and compares it with the gesture pattern of an input halt memorized by the gesture storage means 9. Nothing is carried out if not in agreement. If the gesture pattern of the actuation positional information 18 and an input halt is in agreement, the gesture discernment means 8 will output stop instruction 19 to the control means 6 of operation and the timer means 7. The control means 6 of operation outputs actuation / halt control signal 17 to the touch panel drive circuit 3 and the operating state display means 5. The touch panel drive circuit 3 stops a normal driving signal, outputs only the driving signal 15 for a gesture monitor to the resistance film type touch panel 1, and suspends normal actuation. The control means 6 of operation outputs a display instruction 16 to a liquid crystal display 2, and displays on a liquid crystal display 2 that it is the idle state which cannot be inputted

from the resistance film type touch panel 1. The timer means 7 is made into a idle state. An application program 11 will be in a idle state, and suspends the input of the actuation positional information 18.

[0023] Next, the actuation which identifies gesture and resumes alter operation is explained. In the idle state of personal digital assistant equipment of operation, the gesture discernment means 8 identifies the gesture which confirms alter operation from the resistance film type touch panel 1. The gesture discernment means 8 reads gesture from the gesture storage means 9. The actuation positional information 18 is supervised and it compares with a gesture pattern. Nothing is carried out if not in agreement. If the actuation positional information 18 and a gesture pattern are in agreement, the gesture discernment means 8 will output the instruction 19 of operation to the control means 6 of operation and the timer means 7. The control means 6 of operation outputs actuation / halt control signal 17 to the touch panel drive circuit 3 and the operating state display means 5. The touch panel drive circuit 3 outputs a driving signal 15 to the resistance film type touch panel 1, and starts normal actuation. The control means 6 of operation outputs a display instruction 16 to a liquid crystal display 2, and displays on a liquid crystal display 2 that it is the normal operating state which can be inputted from the resistance film type touch panel 1. The timer means 7 is rebooted from a idle state. An application program 11 returns to normal operating state from a idle state, and resumes the input of the actuation positional information 18.

[0024] Next, when there is no fixed time amount input, the actuation which suspends an input is explained. Alter operation from the resistance film type touch panel 1 is made into an invalid until it detects that the effective input discernment means 13 does not have the effective alter operation from the resistance film type touch panel 1 fixed time amount and the gesture which newly confirms actuation is detected. The effective input discernment means 13 supervises the actuation positional information 18, and if it judges that it is an effective input, it will output the timer reboot instruction 20 to the timer means 7. The timer means 7 inputs the scene information from the terminal actuation scene selection means 12, and sets up counted value. If the timer means 7 reaches the counted value which counted and set up the clock signal, it will output stop instruction 22 to the control means 6 of operation. The actuation after this is the same as a halt by gesture. If the timer reboot instruction 20 is inputted before reaching the set-up counted value, a count will be performed from the beginning. Therefore, if there is no effective input over the fixed time amount, it will stop.

[0025] As mentioned above, since it considered as the configuration which formed a gesture registration means, the gesture discernment means, the timer means, the control means of operation, and the operating state display means in the touch panel control section of personal digital assistant equipment with a touch panel according to the gestalt of operation of the 1st of this invention, a halt of a touch panel of operation and directions of a restart of operation can be performed in actuation of the touch panel itself, and a user can operate a touch panel simply and certainly.

[0026] (Gestalt 2 of operation) The gestalt of operation of the 2nd of this invention is personal digital assistant equipment with a touch panel which formed a gesture registration means, a gesture discernment means, the terminal actuation scene selection means, the timer means, the control means of operation, and the operating state display means in the touch panel control section. The place where the gestalt of the 2nd operation

differs from the gestalt of the 1st operation is a point which identifies and controls gesture according to the scene of a terminal of operation.

[0027] Drawing 2 is the block diagram showing the configuration of the 2nd of the personal digital assistant equipment of the gestalt of operation of this invention. The fundamental configuration is the same as the gestalt of operation of the 1st of drawing 1. The terminal actuation scene selection means 12 is a means for a terminal to generate the scene information 21 which shows in what kind of scene it is operating now, and to output to the timer means 7 and the gesture discernment means 8.

[0028] Actuation of the personal digital assistant equipment of the gestalt of operation of the 2nd of this invention constituted as mentioned above is explained with reference to drawing 2. Fundamental actuation is the same as the gestalt of the 1st operation.

[0029] The actuation which registers gesture is explained. A user decides the field of the arbitration of the resistance film type touch panel 1 to be a gesture input area, and decides the simple actuation (for example, actuation which carries out a double-tap) to the field to be gesture. At this time, the gesture which confirms alter operation from the resistance film type touch panel 1 is decided according to the scene of personal digital assistant equipments, such as an "item selection scene", an "alphabetic character selection scene", and "an input scene of a handwriting alphabetic character and a picture", of operation. If personal digital assistant equipment is set as gesture register mode, since "Input the gesture of an item selection scene" will be displayed on a liquid crystal display 2, gesture actuation according to a scene of operation is performed to a gesture input area. The gesture registration means 10 stores the actuation positional information 18 (positional information and time series information on an actuation condition) of the gesture in the gesture storage means 9 as a gesture pattern for every scene of operation. This is repeated about all scenes of operation. After registration of the gesture of all scenes of operation finishes, a user cancels the gesture register mode of personal digital assistant equipment. Now, gesture registration is ended.

[0030] Next, the actuation which identifies gesture and suspends alter operation is explained. In the normal operating state of personal digital assistant equipment, the gesture discernment means 8 supervises the actuation positional information 18, and compares it with the gesture pattern of an input halt memorized by the gesture storage means 9. Nothing is carried out if not in agreement. If the gesture pattern of the actuation positional information 18 and an input halt is in agreement, the gesture discernment means 8 will output stop instruction 19 to the control means 6 of operation and the timer means 7. The control means 6 of operation outputs actuation / halt control signal 17 to the touch panel drive circuit 3 and the operating state display means 5. The touch panel drive circuit 3 stops a normal driving signal, outputs only the driving signal 15 for a gesture monitor to the resistance film type touch panel 1, and suspends normal actuation. The control means 6 of operation outputs a display instruction 16 to a liquid crystal display 2, and displays on a liquid crystal display 2 that it is the idle state which cannot be inputted from the resistance film type touch panel 1. The timer means 7 is made into a idle state. An application program 11 will be in a idle state, and suspends the input of the actuation positional information 18.

[0031] Next, the actuation which identifies gesture and resumes alter operation is explained. In the idle state of personal digital assistant equipment of operation, the gesture discernment means 8 identifies the gesture which confirms alter operation from

the resistance film type touch panel 1 according to the scene of personal digital assistant equipments, such as an "item selection scene", an "alphabetic character selection scene", and "an input scene of a handwriting alphabetic character and a picture", of operation. The gesture discernment means 8 inputs the scene information from the terminal actuation scene selection means 12, and reads the gesture corresponding to the scene information in a idle state from the gesture storage means 9. The actuation positional information 18 is supervised and it compares with the gesture pattern corresponding to scene information. Nothing is carried out if not in agreement. If the actuation positional information 18 and a gesture pattern are in agreement, the gesture discernment means 8 will output the instruction 19 of operation to the control means 6 of operation and the timer means 7. The control means 6 of operation outputs actuation / halt control signal 17 to the touch panel drive circuit 3 and the operating state display means 5. The touch panel drive circuit 3 outputs a driving signal 15 to the resistance film type touch panel 1, and starts normal actuation. The control means 6 of operation outputs a display instruction 16 to a liquid crystal display 2, and displays on a liquid crystal display 2 that it is the normal operating state which can be inputted from the resistance film type touch panel 1. The timer means 7 is rebooted from a idle state. An application program 11 returns to normal operating state from a idle state, and resumes the input of the actuation positional information 18.

[0032] Next, when there is no fixed time amount input, the actuation which suspends an input is explained. Alter operation from the resistance film type touch panel 1 is made into an invalid until it detects that the effective input discernment means 13 does not have the effective alter operation from the resistance film type touch panel 1 fixed time amount according to the condition of personal digital assistant machines, such as an "item selection scene", an "alphabetic character selection scene", and "an input scene of a handwriting alphabetic character and a picture", and the gesture which newly confirms actuation is detected. The effective input discernment means 13 supervises the actuation positional information 18, and if it judges that it is an effective input, it will output the timer reboot instruction 20 to the timer means 7. The timer means 7 inputs the scene information from the terminal actuation scene selection means 12, and the counted value corresponding to scene information is set up. If the timer means 7 reaches the counted value which counted and set up the clock signal, it will output stop instruction 22 to the control means 6 of operation. The actuation after this is the same as a halt by gesture. If the timer reboot instruction 20 is inputted before reaching the set-up counted value, a count will be performed from the beginning. Therefore, if there is no effective input over the time amount on which it decided for every scene of operation, it will stop. The automatic stay according to an actuation scene is realizable by setting two or more counted value corresponding to scene information as the timer means 7. For example, the time amount to automatic stay is changeable in the scene where actuation spacing is short, like the scenes where actuation spacing is comparatively long, such as under a text input, and item selection.

[0033] According to the gestalt of operation of the 2nd of this invention, to the touch panel control section of personal digital assistant equipment with a touch panel As mentioned above, a gesture registration means, Since it considered as the configuration which established a gesture discernment means, the terminal actuation scene selection means, the timer means, the control means of operation, and the operating state display

means Since a halt of a touch panel of operation and directions of a restart of operation can be performed by the gesture according to the scene of a terminal of operation, a user can operate a touch panel simply and certainly.

[0034]

[Effect of the Invention] To the touch panel control section which controls the touch panel which is the input section about personal digital assistant equipment by this invention, as mentioned above, a gesture registration means, Since it considered as the configuration possessing a gesture discernment means, a device-status discernment means, an actuation-less detection means, touch panel actuation effective and an invalid control means, and a touch panel operating state display means The change of effective [of operation] and a halt of operation of the touch panel of personal digital assistant equipment with a touch panel can be performed in the actuation from the touch panel itself, and the effectiveness that a user can be provided with certain and comfortable actuation is acquired.

[0035] Moreover, in this invention, since it considered as the configuration which establishes a gesture registration means to register the gesture corresponding to a scene of operation into a gesture storage means beforehand, forms a terminal actuation scene selection means in an application program, and is notified to a gesture discernment means by making the operating state of personal digital assistant equipment into scene information, the effectiveness that a touch panel can be operated by the simple gesture according to operating state is acquired.

[0036] Moreover, since it considered as the configuration which forms an effective input discernment means in an application program, and establishes a timer means further in this invention, when there is no effective input for fixed time amount programmed beforehand and an application program, stop instruction can be automatically published to a control means of operation, touch panel actuation can be suspended automatically, and the effectiveness that the operation mistake by unprepared migration etc. is mitigable is acquired.

[0037] Moreover, in this invention, by programming two or more timer values for a timer means, touch panel actuation automatic stay according to an actuation scene can be realized, and the effectiveness of becoming easy to use since automatic-stay time amount is changeable in the scene where actuation spacing is short, like the scenes where actuation spacing is comparatively long, such as under a text input, and item selection is acquired.

[0038] Moreover, in this invention, a user can check the letter bear of actuation of a touch panel visually by adding an operating state display means, and the effectiveness of becoming easier to use is acquired.

